भारतीय मानक
Indian Standard

IS 17619 : 2021

जेलेन गम, खाद्य ग्रेड — विशिष्टि

Gellan Gum, Food Grade — Specification

ICS 67.220.20

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September 2021 **Price Group 3**

Food Additives Sectional Committee, FAD 08

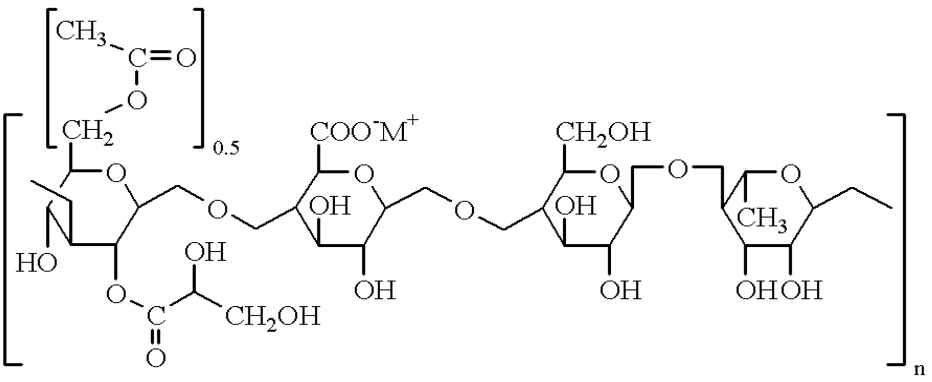
NATIONAL FOREWORD

This Indian Standard was adopted by the Bureau of Indian Standards after the draft finalized by the Food Additives Sectional Committee had been approved by the Food and Agriculture Division Council.

Gellan gum is a high molecular weight polysaccharide gum produced by a pure culture fermentation of a carbohydrate by *Pseudomonas elodea*, purified by recovery with ethanol or 2-propanol, dried, and milled. The high molecular weight polysaccharide is principally composed of a tetrasaccharide repeating unit of one rhamnose, one glucuronic acid, and two glucose units, and is substituted with acyl (glyceryl and acetyl) groups as the O-glycosidically-linked esters. The glucuronic acid is neutralized to a mixed potassium, sodium, calcium, and magnesium salt. It usually contains a small amount of nitrogen containing compounds resulting from the fermentation procedures.

Gellan gum is widely used as thickener and texture stabilizer in food and beverage industries. It is permitted as a food additive under the Food Safety and Standards (Food Products Standards and Food Additives) Regulations, 2011.

Structural formula:



In the preparation of this standard the requirements given in the following publications have been taken into consideration:

a) Codex General Standards for Food Additives (GSFA) FAO JECFA Monographs 16 (2014).

b) E 418 under the European Commission Directive No 231/2012 of 9 March 2012.

c) Japan’s Specifications and Standards for Food Additives 8th Edition of the Japan Food Chemical Research Foundation.

In the preparation of this standard, due consideration has been given to the *Legal Metrology (Packaged Commodities) Rules*, 2011 and *Food Safety and Standards Act* 2006 and Rules and Regulations framed thereunder. The standard is however subject to restrictions imposed under these rules wherever applicable.

For the purpose of deciding whether a particular requirement of this standard is complied with the final value, observed or calculated, expressing the results of a test or analysis shall be rounded off in accordance with IS 2 : 1960 ‘Rules for rounding off numerical values (*revised*)’.

Indian Standard

GELLAN GUM, FOOD GRADE — SPECIFICATION

1 SCOPE

This standard prescribes the requirements and methods of sampling and test for gellan gum, food grade.

2 REFERENCES

The following standards contain provisions which, through reference in this text, constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below:

IS No.	*Title*
460 (Part 1) : 2020	Specification for test sieves: Part 1 Wire cloth test sieves
1070 : 1992	Reagent grade water (*third revision*)
1699 : 1995	Methods of sampling and test for food colours
2491 : 2013	Food hygiene — General principles — Code of practice
5402 (Part 2) : 2021/ ISO 4833-2 : 2013	Microbiology of the food chain — Horizontal method for the enumeration of microorganisms: Part 2 Colony count at 30 °C by the surface plating technique
5887 (Part 1) : 1976	Methods for detection of bacteria responsible for food poisoning: Part 1 Isolation, identification and enumeration of Escherichia coli (*first revision*)
5887 (Part 3) : 1999/ ISO 6579 : 1993	Methods for detection of bacteria responsible for food poisoning: Part 3 General guidance on methods for detection of Salmonella (*second revision*)
7928 : 1993	Alginic acid, food grade (*first revision*)
16069 (Part 2) : 2013/ ISO 21527-2 : 2008	Microbiology of food and animal feeding stuffs — Horizontal method for the enumeration of yeasts and moulds: Part 2 Colony count technique in products with water activity less than or equal to 0.95

3 REQUIREMENTS

3.1 Description

Gellan gum shall be an off-white powder, soluble in water forming a viscous solution and insoluble in ethanol.

3.2 Identification

3.2.1 *Gel Test with Calcium Ion*

Add 1.0 g of the sample to 99 ml of water, and stir for about 2 h, using a motorized stirrer having a propeller-type stirring blade. Draw a small amount of this solution into a wide bore pipette and transfer into a 10 percent solution of calcium chloride. A tough worm-like gel will be formed immediately.

3.2.2 *Gel Test with Sodium Ion*

Add 1.0 g of the sample to 99 ml of water, and stir for about 2 h, using a motorized stirrer having a propeller-type stirring blade. Add 0.50 g of sodium chloride, heat to 80 °C with stirring, and hold at 80 °C for 1 min. Allow the solution to cool to room temperature. A firm gel is formed.

3.3 Hygienic Conditions

The product shall be manufactured and packed under hygienic conditions as per IS 2491.

3.4 Microbiological Requirements

3.4.1 *Escherichia coli* shall be absent in 5g of the sample when tested in accordance with the method given in IS 5887 (Part 1) : 1976.

3.4.2 *Salmonella* shall be absent in 10g sample when tested in accordance with the method given in IS 5887 (Part 3) : 1999.

3.4.3 *Yeast and mould* shall not exceed 400/g when tested in accordance with the method given in IS 16069 (Part 2) : 2013.

3.4.4 The total viable colony count shall not exceed 10 000/g when tested in accordance with the methods given in IS 5402 (Part 2) : 2021.

3.5 A minimum of 95 percent of the material shall pass through 180 micron IS sieve [*see* IS 460 (Part 1)].

3.6 Residual isopropanol shall not be more than 750 mg/kg and residual ethanol shall not be more than 50 mg/kg when tested as per the method given in Annex B of this Standard.

3.7 The product shall comply with the requirements of pesticide residues, heavy metals, aflatoxins, etc., as prescribed in *Food Safety and Standards Act*, 2006 and the Rules made thereunder.

3.8 The product shall also conform to the requirements given in Table 1.

4 PACKING, STORAGE AND MARKING

4.1 Packing

The material shall be packed only in sound clean, dry and un-used containers as agreed to between the purchaser and supplier. The material shall be filled in containers with as little air space as possible. The containers shall be such as to preclude air contamination of the contents with metals or other impurities.

4.2 Storage

Gellan gum should be stored in a cool, dry, covered and ventilated area away from sources of heat, moisture and incompatibilities.

4.3 Marking

4.3.1 Each container shall be marked legibly to give the following information:

a) Name of the material including the words ‘Food Grade’;
b) Source of manufacture;
c) Net quantity when packed;
d) Batch or code number;
e) Date of manufacture;
f) Instruction for storage;
g) Best before date (month and year to be given by the manufacturer); and
h) Any other requirements as specified under the *Legal Metrology* (*Packaged Commodities*) *Rules,* 2011 and *Food Safety and Standards* (*Packaging and Labelling*) *Regulation*, 2011 and the Rules framed thereunder.

4.3.2 *BIS Certification Marking*

The product(s) conforming to the requirements of this standard may be certified as per the conformity assessment schemes under the provision of *Bureau of Indian Standards Act*, 2016 and Rules and Regulation framed there under and the product(s) may be marked with the Standard Mark.

5 SAMPLING

The representative samples of the material shall be drawn and conformity of the material to the requirements of this specification shall be determined according to the procedure prescribed in 4 of IS 1699 : 1994.

6 TESTS

6.1 Tests shall be carried out by the methods specified in the standard.

6.2 Quality of Reagents: Unless specified otherwise, pure chemicals and distilled water (*see* IS 1070 : 1992) shall be employed in tests.

NOTE — ‘Pure chemicals’ shall mean chemicals that do not contain impurities which affect the result of analysis.

Table 1 Requirements for Gellan Gum, Food Grade

(*Clause* 3.8)

Sl No.	Characteristic	Requirement	Method of Test, Ref to	
			Annex of this Standard	Indian Standards
(1)	(2)	(3)	(4)	(5)
i)	Gellan gum content (on dry basis), percent by mass, *Min*	85.0	A	–
ii)	Loss on drying, percent by mass, *Max*	15.0	–	A-2 of IS 7928 : 1993
iii)	Total Ash, percent by mass, *Max*	12.0	–	A-4 of IS 7928 : 1993
iv)	Nitrogen, percent by mass, *Max*	3.0	–	IS 5194 : 1969
v)	Lead (as Pb), mg/kg, *Max*	2	–	15 of IS 1699 : 1995
vi)	Arsenic (as As), mg/kg, *Max*	3	–	15 of IS 1699 : 1995
vii)	Cadmium (as Cd), mg/kg, *Max*	1	–	15 of IS 1699 : 1995
viii)	Mercury (as Hg), mg/kg, *Max*	1	–	15 of IS 1699 : 1995

ANNEX A

[*Table* 1, *Sl No*. (1)]

DETERMINATION OF GELLAN GUM CONTENT

A-1 EQUIPMENT AND GLASSWARE

A-1.1 Hot Air Oven, with temperature controller and indicator.

A-1.2 Water Bath, with temperature controller.

A-1.3 Vacuum Pump

A-1.4 Glass Filter Crucible, (G3 or equivalent).

A-1.5 Dessicator

A-1.6 Thermometer

A-2 REAGENTS

A-2.1 Diatomaceous Earth

A-2.2 Isopropyl Alcohol

A-3 PROCEDURE

A-3.1 Take about 1.0 g of diatomaceous earth for chromatography, place into a glass filter crucible (G3), and spread uniformly. Dry at 105 °C for 5 h; allow cooling in a desiccator and weigh accurately.

A-3.2 Weigh accurately about 0.2 g of dried gellan gum, add 50 ml of water, and dissolve while stirring in a water bath. Add 200 ml of isopropyl alcohol warmed at 60-70 °C previously, mix well, and allow to stand overnight. Filter the gained precipitate by the glass filter as mentioned above, using isopropyl alcohol.

A - 3.3 Wash the residue 3 times with each 20 ml of 78 percent by volume of isopropyl alcohol and wash twice with each 10 ml of 78 percent by volume of isopropyl alcohol. Dry the glass filter crucible at 105 °C ± 1 °C overnight, cool in a desiccator and weigh accurately.

A-3.4 Calculate the content by the following formula:

Content of gellan gum,percent by mass

$$= \frac{\text{Weigh}\,(\text{g})\,\text{of the residue} \times 100}{\text{Weight}\ (\text{g})\ \text{of the sample}}$$

ANNEX B

(*Clause* 3.6)

DETERMINATION OF RESIDUAL ISOPROPANOL AND ETHANOL

B-1 EQUIPMENT

B-1.1 Gas Chromatography Conditions

a) Column: 25 percent Diphenyl-75 percent dimethylpolysiloxane (60 m x 0.25 mm that is, 0.25 µm film) [Aquatic-2 (GL-Sciences Inc.) or equivalent].
b) Carrier gas: Helium.
c) Flow rate: 1.8 ml/min.
d) Detector: Flame-ionization detector (FID).
e) Temperatures:
    1) Injector: 250° C.
    2) Column: Hold for 5 min at 40°, then 40-92 °C at 4° C/min.
    3) Detector: 260 °C.

B-1.2 Analytical balance of least count = 0.0001g.

B-1.3 Wrist action mechanical shaker.

B-1.4 Magnetic stirrer.

B-2 REAGENTS

B-2.1 Isopropanol, Chromatography Grade

B-2.2 Tertiary Butyl Alcohol, Chromatography Grade

B-2.3 Double Distilled Water

B-2.4 Standard Solutions

B-2.4.1 *Standard Solution*

Transfer 100.0 mg of chromatographic quality ethanol into a 200 ml volumetric flask and 150.0 mg of 2-propanol into a 20 ml volumetric flask, then dilute to volume with water. Pipette each 1 ml of solutions into a 100 ml volumetric flask and dilute to volume with water as standard solution A. Pipette 10 and 5 ml of standard A into two separate 20 ml volumetric flasks and dilute to volume with water as standard solution B and standard solution C.

B-3 PROCEDURE

B-3.1 Sample Preparation

Weigh accurately 0.10 g of the sample into each of four 20 ml headspace vials. Add a magnetic stirring bar and 10 ml of either water, standard solution A, B or C into each vial and seal. After standing vials overnight at room temperature, stir the solution in the vials for 1 min.

B-3.2 Place the sample vial in the sample tray on head-space gas chromatograph. Heat vials at 60 °C for 40 min with continuous agitation. Inject 1.0 ml of the head space gas (syringe temperature: 100 °C, transfer temperature: 120 °C) in the vial into the chromatograph and measure the peak area for ethanol and 2 propanol. Plot the relationship between the added amount against the peak area for ethanol or 2-propanol. Extrapolate the x-intercept for ethanol and 2-propanol (W_e and W_p).

B-3.3 Calculation

Calculate the concentration of ethanol and 2-propanol from:

$$\text{Ethanol (mg/kg)} = \frac{W_e}{W}$$

and

$$\text{2-Propanol (mg/kg)} = \frac{W_p}{W}$$

where

W is weight of sample (g).

ANNEX A

(*Foreword*)

COMMITTEE COMPOSITION

Food Additives Sectional Committee, FAD 08

Organization	*Representative(s)*
CSIR-Indian Institute of Toxicology Research, Lucknow	Dr Yogeshwar Shukla (***Chairman***)
All India Food Processors Association, (India)	Ms Shreya Pandey Mr Krishna Kumar Joshi (*Alternate*)
Association of Food Scientists and Technologists India, Mumbai	Dr Vikas Singh Chauhan Dr Nandini P. Shetty (*Alternate*)
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Member Secretary

MS. VARSHA GUPTA
SCIENTIST 'D' (FAD), BIS

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Amendments are issued to standards as the need arises on the basis of comments. Standards are also reviewed periodically; a standard along with amendments is reaffirmed when such review indicates that no changes are needed; if the review indicates that changes are needed, it is taken up for revision. Users of Indian Standards should ascertain that they are in possession of the latest amendments or edition by referring to the latest issue of 'BIS Catalogue' and 'Standards: Monthly Additions'.

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Amendments Issued Since Publication

Amend No.	Date of Issue	Text Affected

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